United States Patent [19]

Wagner

[11] **3,785,335**

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[54] **AIR HORN**

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[52] **U.S. Cl.** ..... **116/112**, 46/181, 116/142 R, 222/402.1, 222/402.25

[51] **Int. Cl.** **G08b 21/00**

[58] **Field of Search** ..... 116/112, 65, 137, 116/142, 142 FP, 139; 46/44, 181, 90, 179, 180; 137/221; 251/353; 222/402.25, 402.1, 402.17

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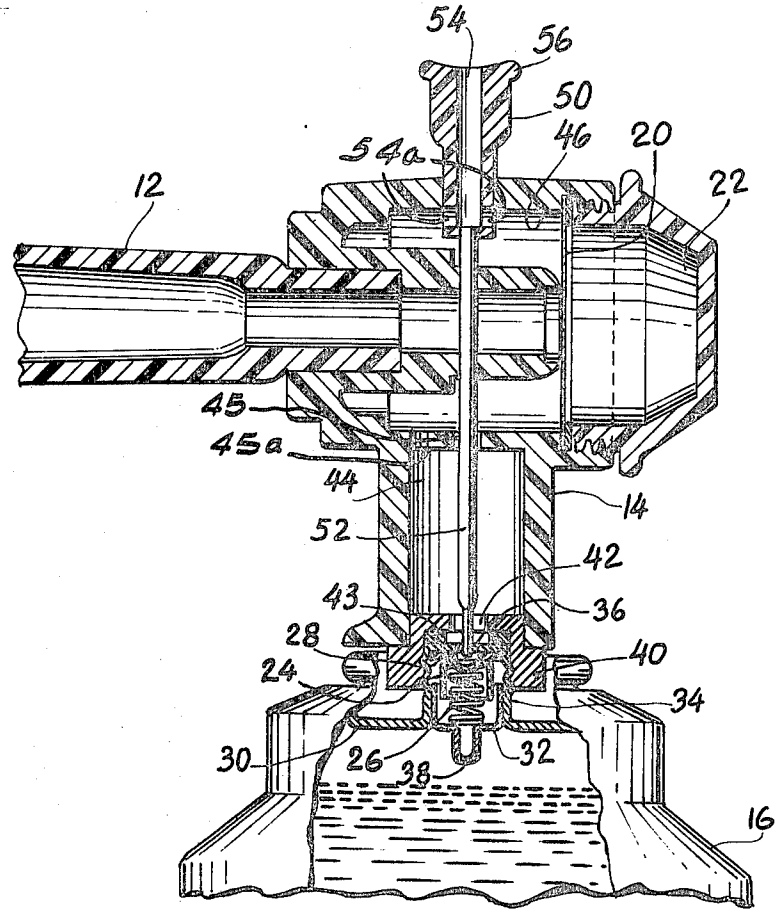
Primary Examiner—Louis J. Capozi
Attorney—Samuel J. Stoll et al.

[57] **ABSTRACT**

A horn which may be sounded selectively by blowing through a mouthpiece or by release of compressed gas. Valve means are provided to control the release of compressed gas and valve means are provided to close the mouthpiece. The two valve means may be independent or may be joined.

In the preferred embodiment a button, which when manually depressed opens a valve permitting the compressed gas to escape via the diaphragm and sound the horn, is provided with a central hole communicating to the diaphragm and is shaped like a mouthpiece. The horn may be sounded by blowing into the mouthpiece button to provide a stream of air past the diaphragm and through the horn. By manually depressing the button, the hole therein is automatically sealed.

8 Claims, 6 Drawing Figures



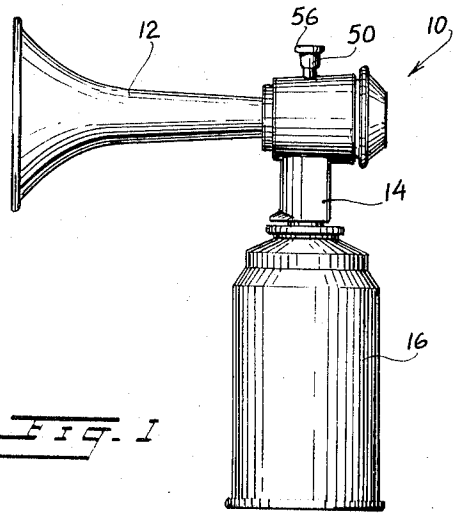


Fig. 1

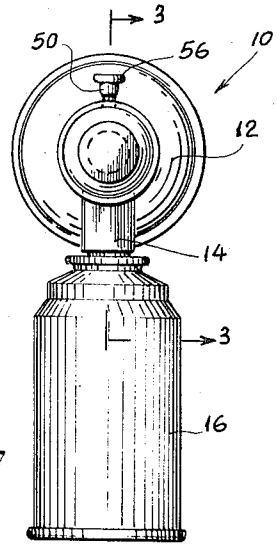


Fig. 2

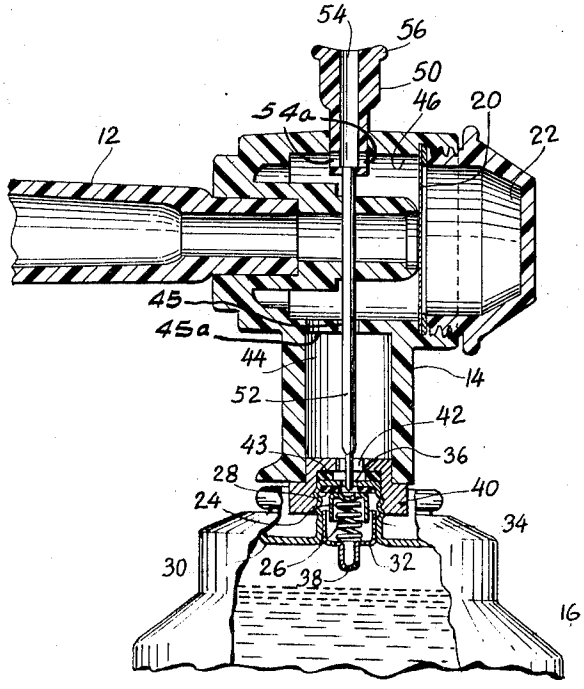


Fig. 3

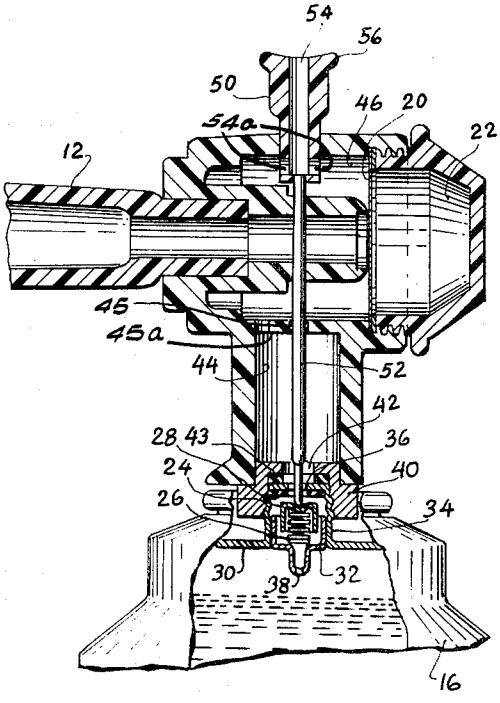


Fig. 4

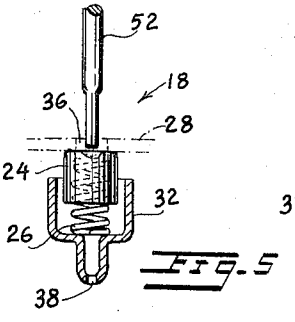


Fig. 5

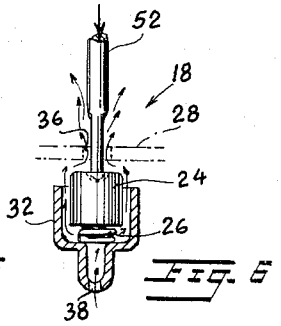


Fig. 6

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AIR HORN

BACKGROUND OF THE INVENTION

Horns powered by compressed gas are well known. See, for example, applicant's own U.S. Pat. No. 3,590,770 which issued July 6, 1971. The pressurized propellant is commonly provided in a container of relatively limited capacity and it is intended that an exhausted container either be replaced or, if provision is made therefor, be recharged. Inconvenience and even danger may occur, however, when no fresh supply of pressurized propellant is available when the contents of the container attached to the horn are exhausted.

An example of the danger which may attend loss of pressurization without opportunity for replenishment is a mariner's fog horn. It is not uncommon for a mariner to completely deplete his stores of pressurized propellant under the heavy use to which his fog horn would be put during periods of low visibility and it is during such periods that it is dangerous to lose the use of a fog horn. Similarly, horns for signaling purposes are not available if the pressurized propellant has been completely used and no replacement or replenishment are available. Accordingly, the present invention provides a unique air horn which incorporates provision for manual sounding in addition to sounding by pressurized propellant.

SUMMARY OF THE INVENTION

In conventional pressurized propellant horns, there are valve means manually actuated to control sounding of the horn. Actuation may be a button which when depressed opens a spring-urged valve and which when released permits the valve to close. It is an important feature of the primary embodiment of the present invention that such button be provided with a central bore which communicates with the diaphragm chamber and the horn, permitting use of the button as a mouthpiece for manual sounding of the horn. Complete exhaustion of the pressurized propellant results in a horn which may be manually sounded rather than an unusable implement as is the case with prior devices.

Broadly speaking, the invention is of a horn which may be selectively sounded by compressed gas or by blowing by mouth. In the preferred embodiment the mouthpiece is also the means by which the compressed gas is controlled.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view of the air horn of the present invention showing the container for the pressurized propellant and the horn coupled in the conventional manner.

FIG. 2 is a front view of the horn and container shown in FIG. 1.

FIG. 3 is an enlarged cross-sectional view taken across line 3—3 of FIG. 2 and showing the container partially broken away to disclose its content.

FIG. 4 is a view similar to that of FIG. 3 but showing the actuating button depressed and the container valve open. In this configuration and with pressurized propellant in the container the horn is sounding.

FIG. 5 is an enlarged fragmentary view of the container valve shown in its closed position.

FIG. 6 is a view similar to that of FIG. 5 but showing the valve in its open position and schematically showing gas flow out of the container by means of arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Referring to the drawing, air horn **10** of the present invention comprises a horn **12** including a housing **14**, a pressurized container **16** removably coupled to housing **14**, and valve means **18** functionally located between horn **12** and container **16**.

Horn **12** includes a vibrating diaphragm **20** located in accordance with the standard practice at the input or reduced diameter end of horn **12**. Vibration of diaphragm **20** is induced by a high velocity gas flow generated between the diaphragm and the adjacent small open end of the horn by a source of pressure. Diaphragm **20** forms a sealed chamber **22** in conjunction with a portion of housing **14** on the side of diaphragm **20** opposite horn **12**. The sealed chamber provides rebounding compression against diaphragm **20** as the diaphragm is forced into the chamber by the high velocity gas flow. The diaphragm is thus provided with a "bounce" which provides diaphragm vibration in conjunction with the gas flow which induces pressure variations in the gas flow out of the horn. With proper tuning, which is provided during manufacture of the horn, the frequency of those pressure variations occur in the audible range and are amplified by the horn.

Valve means **18** is a reverse spring-loaded check valve in which a valve **24** is spring-urged by spring **26** into sealing engagement with seat **28**. Manual lifting of valve **24** away from its seat **28** provides an opening through which a gas may pass. It should be clearly understood, however, that any suitable valve means may be used. The valve means just described is that which is commonly used in disposable containers of pressurized propellant which are sold in uniform sizes convenient for use and which are intended to be disposed of when exhausted and not refilled.

In the conventional valve means disclosed herein the valve mechanism is connected to container **16** by a collar **30** which incor-porates a retaining member **32** for spring **26**. Valve seat **28** is held in position by the closed top of upstanding cylindrical extension **34** of collar **30**. The valve **24** is a sealing disk which may be flanged to hold spring **26** in position. The central portion of seat **28** and the adjacent top of cylindrical extension **34** are provided with co-axial holes forming a passageway **36**. Valve **24** circumferentially seals passageway **36** when closed against seat **28**. A hole is provided in retaining member **32** such that there is communication and an escape path from the interior of the container through hole **38** and out of passageway **36** when valve **24** is open. Cylindrical extension **34** is conventionally provided with external threads and housing **14** is provided with an internally threaded coupling **40** such that container **16** may easily be screwed on and off horn **12**. A gasket **43** is provided to prevent the escape of pressurized gas between the container at the top of cylindrical extension **34** and horn **12** at threaded coupling **40**.

Communication between the interior of container **16** and horn **10** is through valve means **18**, note FIG. **5**, a hole **42** provided for the purpose in threaded coupling **40** into a conduit **44** formed by housing **14**, and thence, through air opening **45** in partition **45***a*, into chamber **46** which is exposed to diaphragm **20** and the small end of horn **12**. Communication is, of course, controlled by opening and closing of valve means **18**.

Actuation of valve means **18** is provided by a button **50** which is slidably secured to housing **14** and which is provided with an extension **52** which extends from button **50** to valve **24** and which is substantially coaxial with movement of valve **24.** Manual depressing of button **50** pushes valve **24** away from seat **28** and opens the valve to a flow of gas. Releasing button **50** permits spring **26** to close the valve and in doing so it raises button **50** to the original position. Valve **24** may be cupped to engage the ends of button extension **52** without slippage. In order to extend from button **50** to valve **24,** button extension **52** passes through coupling hole **42** and passageway **36.**

It is an important feature of the invention that button **50** is provided with a bore **54** which extends from the top of button **50** to chamber **46** by way of port **54***a* into which button **50** extends. There is accordingly an opening between chamber **46** and the outside of horn **10.**

Operation of air horn **10** may now be described. Placing a finger on the top of button **50** and depressing the button opens valve **24** and permits the pressurized propellant in container **16** to generate an air flow into chamber **46** and out of the horn past diaphragm **20.** The presence of the finger on the button closes bore **54** and seals chamber **46** thereby preventing unwanted escape of the pressurized propellant through the bore. Should, however, there no longer be any pressure left in container **16,** it is the purpose of the invention to permit the generation of pressure in chamber **46** and consequently air flows past diaphragm **20** and out of the horn by simply placing one's mouth around button **50** and forcibly blowing through bore **54** into chamber **46.** The horn will now sound as though the pressure emanated from counter **16.**

For comfort and convenience of operation, button **50** may have its top formed concavely inwardly to provide a convenient seat for a finger. This promotes correct yet rapid placement of the finger directly over bore **54** to provide adequate sealing of the bore during pressurized container operation of the horn. Button **50** is further shaped to form a convenient and comfortable mouthpiece having a flange **56** with smoothly rounded edges to provide ease of use with full sealing of the lips around the button.

Bore **54** communicates with chamber **46** at all times regardless of whether or not button **50** is depressed. This permits manual use of the horn by blowing into the button without the necessity for depressing the button and consequently releasing of any residual pressure which may inadvertently be left in container **16.**

To promote ease of use during the manual blowing operation, it is desirable to provide a diaphragm which is relatively resilient so that adequately loud sounding of the horn may be provided with moderate and reasonable lung pressure.

While the foregoing is illustrative of a preferred embodiment of the invention, it is clear that other embodiments may be had within the teachings hereof. For example, any valve means may be utilized in conjunction with any mouthpiece which communicates with chamber **46** provided that there are means to seal the mouthpiece while the valve is open. In the preferred embodiment as described, there is shown a unique method of combining actuation of the valve with sealing of the mouthpiece but it is understood that the invention is intended to encompass other such combinations. Further, the source of compressed gas may be a bellows, pump or the like.

I claim:

1. An air horn, comprising:
a. a horn;
b. diaphragm means, said diaphragm means being located adjacent the input end of said horn and being sufficiently responsive to lung air pressure to sound said horn thereby;
c. a source of compressed gas;
d. flow control means, said flow control means connected between said source of compressed gas and said diaphragm and said horn to control the flow of the gas through, and sounding of, said horn;
e. a mouthpiece, said mouthpiece having a bore communicating with said diaphragm and said horn such that blowing through said mouthpiece sounds the horn, said bore being manually closable; and
f. actuating means, said actuating means being connected between said mouthpiece and said flow control means, said flow control means being actuated thereby.

2. An air horn in accordance with claim **1,** wherein:
a. said flow control means comprises valve means;
b. said mouthpiece and said actuating means being movable, said actuating means being connected to said valve means to actuate the same and thereby control the flow of compressed gas through, and sounding of, said horn.

3. An air horn in accordance with claim **2,** wherein: said mouthpiece comprises a button, said button being connected to said actuating means to actuate said valve means.

4. An air horn in accordance with claim **3** wherein: said valve means comprise a valve member spring-urged into normally closed engagement with a valve seat, said valve means being openable by pressure exerted on said valve member in a direction away from said seat.

5. An air horn in accordance with claim **4,** wherein: said actuating means comprises an extension of said button, said extension extending between said button and said valve member whereby movement of said button correspondingly moves said extension and said valve member.

6. An air horn in accordance with claim **5,** wherein: said valve seat is provided with a central passageway through which said extension passes.

7. An air horn adapted to be sounded by a source of compressed gas and by blowing by mouth, comprising:
a. a horn;
b. a source of compressed gas;
c. flow control and mouthpiece means, said flow control and mouthpiece means connected between said source of compressed gas and said horn and controlling the flow of compressed gas to said horn, said flow control and mouthpiece means having a bore in communication with said horn for oral use,
d. whereby said horn may be sounded by said compressed gas or by mouth by selective use of said flow control and mouthpiece means.

8. An air horn comprising;
a. a horn having
b. a vibratory diaphragm,
c. a closed air chamber on one side of the diaphragm,
d. an open air chamber on the opposite side of the diaphragm, and

e. a source of compressed gas in communication with said open air chamber,

f. said diaphragm being exposed to both air chambers and being sufficiently responsive to compressed gas pressure and to mouth-blown air pressure in the open air chamber to produce a horn sound,

g. flow control means being provided between the source of compressed gas and the open air chamber to control the flow of compressed gas into said open air chamber,

h. said flow control means comprising a normally closed valve and actuating means therefor,

i. said actuating means including a push-button which is pressed to open the valve and which is released to close the valve,

j. said pushbutton having an opening formed therein which communicates with said open air chamber, and being adapted to be held to the mouth so that air might be blown into said open air chamber,

k. said opening being located where it would be digitally closed when the pushbutton is digitally actuated to open the valve,

l. whereby digital actuation of the pushbutton causes the valve to open and the horn to sound by reason of compressed gas impinging upon the diaphragm, and

m. whereby blowing air by mouth into the opening of said pushbutton, without actuating same to open the valve, causes the horn to sound by reason of mouth-blown air impinging upon said diaphragm.

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